

Final Report

Arizona Grain Research and Promotion Council

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Small Grains Variety Testing

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Small Grains Variety Evaluation at Arizona City, Coolidge, Maricopa, and Yuma, 2005

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Summary

Small grain varieties are evaluated each year by University of Arizona personnel. The purpose of these tests is to characterize varieties in terms of yield and other attributes. Variety performance varies greatly from year to year and several site-years are necessary to adequately characterize the yield potential of a variety. A summary of small grain variety trials conducted by the University of Arizona can be found online at <http://ag.arizona.edu/pubs/crops/az1265.pdf>.

Introduction

Small grain varieties were tested as part of the on-going effort to assess variety productivity and characteristics. Barley and durum commercial cultivars and experimental lines were tested. The purpose of these tests is to characterize varieties in terms of yield potential, relative maturity, quality, and other characteristics. Small plot variety trials do not substitute for localized on-farm testing of new varieties. Varieties are known to differ in their response to specific management regimes and weather conditions. A summary of small grain variety trials conducted by the University of Arizona is available from your local Cooperative Extension office or online at <http://ag.arizona.edu/pubs/crops/az1265.pdf>.

Procedure

Barley and durum varieties were evaluated at the following locations: Arizona City by Arizona Plant Breeders, Maricopa by the University of Arizona, Maricopa by World Wide Wheat, and Coolidge (barley) and Yuma (durum) by Western Plant Breeders. The seed was planted with a cone planter in seven rows spaced 7 inches apart and 15-20 ft long. The seeding rate was approximately 100 lbs/acre for durum varieties and 85 lbs/acre for barley varieties. The experimental design was a randomized complete block with 4 replications, 16-18 barley entries, and 24-32 durum entries. Growing conditions at each site are listed in Table 1. The following data was collected: grain yield, test weight, plant height, lodging, heading, flowering (Maricopa, UA only), physiological maturity (Maricopa, UA only), grain protein, and HVAC. Grain was harvested with small plot combines and yields are expressed on an "as is" moisture basis. HVAC was determined from 10 g of seed. Grain protein was determined using the Kjeldahl method and expressed on a 12% moisture basis. Flowering is defined as when about half of the heads are shedding pollen and physiological maturity is defined as when the glumes turn brown. Abbreviations for the sources of varieties are: APB = Arizona Plant Breeders, UA = University of Arizona, WPB = Western Plant Breeders, WWW = World Wide Wheat, UC = University of California.

Discussion

Yield and plant characteristics of the varieties are presented for the various locations in Tables 3-10 and a summary of the grain yields at all locations is presented in Table 11. Several locations and years are needed to accurately assess variety performance. The results of this trial are most useful when combined with data from previous years. A summary of small grain variety trials conducted by the University of Arizona can be found online at <http://ag.arizona.edu/pubs/crops/az1265.pdf>.

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Table 1. Cultural practices for the small grains variety trials at the various locations.

Cultural information	Arizona City (APB)	Maricopa (U of A)	Maricopa (WWW)	Yuma (WPB)
Previous crop	---	Sudangrass	Fallow	Lettuce
Soil texture	Clay loam	Sandy clay loam	Sandy clay loam	Clay loam
Planting date	12/13	12/1	11/19	12/22
Irrigations	---	7 12/1, 1/28, 3/4, 3/18, 4/1, 4/15, 4/30	5 11/19, 2/17, 3/14, 3/24, 4/8	5 12/22, 3/4, 3/25, 4/11, 4/28
Nitrogen (lbs N/a)	300 100 preplant 100 by air 100 in 50/irrigation	230 12/1: 80 as 16-20-0 1/28: 50 as 46-0-0 3/4: 50 as 46-0-0 4/1: 50 as 46-0-0	350 11/15: 60 as 16-20-0 2/17: 100 as 46-0-0 3/14: 100 as 46-0-0 3/24: 50 as 46-0-0 4/8: 40 as 46-0-0	140 3/04: 70 as 32-0-0 3/25: 70 as 32-0-0
Pesticides	---	Buctril on 1/24	Buctril on 1/19	None
Harvest date	5/19	5/25	6/1	5/31

Table 3. Barley variety yield results from **Arizona City (APB)**, 2005.

Entry	Source	Grain Yield ^a	Test Weight	Plant Height	Lodging	Heading on 3/29
		lbs/acre	lbs/bu	inches	%	%
Barcott	WPB	2864	47.0	25	10	100
Baretta	APB	4335	51.0	29	5	80
Chico	WPB	3677	51.6	25	0	11
Cochise	WPB	4296	52.4	27	5	100
Commander	WWW	3561	49.2	27	5	21
Gustoe	WPB	3174	50.1	26	0	6
Max	WWW	3329	45.9	31	0	11
Mucho	APB	2942	48.1	25	10	100
Nebula	WPB	3677	51.2	34	0	51
B02AZ(6)-10	APB	3329	51.1	32	0	6
B00-219	APB	4529	51.9	32	10	100
B02AZ(8)-15	APB	2555	51.9	34	0	90
BA1129	WWW	3290	51.2	31	0	51
BA4545	WWW	3716	50.7	35	20	6
BA8017	WWW	2168	46.9	30	0	1
896-21	APB	4025	51.8	30	5	90
AVERAGE		3467	50.1	30	4	51

^a Grain yield: LSD (5%) = 878 lbs/acre and cv = 17.8%.

Table 4. Barley variety yield results from **Maricopa (UA)**, 2005.

Entry	Source	Grain Yield ^a	Test Weight	Plant Height	Lodging	Heading	Flowering	Maturity
		lbs/acre	lbs/bu	inches	%			
Barcott	WPB	4069	52.9	32	16	3/05	3/07	4/16
Baretta	APB	7247	55.2	36	0	3/16	3/17	4/26
Chico	WPB	5795	54.7	28	0	3/20	3/21	4/28
Cochise	WPB	4907	56.3	35	16	3/08	3/13	4/25
Commander	WWW	6359	54.4	35	0	3/17	3/19	4/26
Gustoe	WPB	6292	55.1	32	0	3/22	3/22	4/28
Max	WWW	6924	54.4	35	0	3/19	3/22	4/29
Mucho	APB	5633	54.4	33	11	3/08	3/09	4/23
Nebula	WPB	6494	54.8	35	0	3/14	3/16	4/25
B02AZ(6)-10	APB	6561	54.0	35	0	3/19	3/20	4/27
B00-219	APB	6305	54.3	36	0	3/10	3/11	4/23
B02AZ(8)-15	APB	3980	54.6	36	0	3/14	3/16	4/23
BA1129	WWW	6668	53.3	34	0	3/13	3/14	4/26
BA4545	WWW	6220	52.7	37	10	3/13	3/18	5/01
BA8017	WWW	7072	51.3	31	0	3/23	3/23	5/09
Poco	AC	3092	54.0	28	0	2/28	3/02	4/09
AVERAGE		5874	54.1	34	3	3/13	3/15	4/25

^a Grain yield: LSD (5%) = 838 lbs/acre and cv = 10.0%.

Table 5. Barley variety yield results from **Maricopa (WWW)**, 2005.

Entry	Source	Grain Yield ^a	Test Weight	Plant Height	Lodging	Heading
		lbs/acre	lbs/bu	inches	%	
Barcott	WPB	2470	49.0	35	80	2/20
Baretta	APB	5331	53.1	33	50	3/13
Chico	WPB	4015	53.5	36	20	3/10
Cochise	WPB	4050	52.4	35	80	2/23
Commander	WWW	4099	52.6	36	10	3/14
Gustoe	WPB	4370	52.9	35	60	3/15
Max	WWW	4834	52.7	37	50	3/19
Mucho	APB	4294	52.9	32	10	2/26
Nebula	WPB	4446	53.4	41	40	3/09
B02AZ(6)-10	APB	4420	51.8	38	40	3/26
B00-219	APB	4563	53.3	34	30	3/04
B02AZ(8)-15	APB	3726	51.5	38	20	3/08
BA1129	WWW	4229	52.9	39	10	3/06
BA4545	WWW	4194	53.1	39	70	3/22
BA8017	WWW	5288	51.3	33	10	3/23
BA4513	WWW	4280	53.2	39	70	3/23
BA9095	WWW	4290	53.1	37	20	3/23
Patti	WWW	3790	52.2	36	20	3/08
AVERAGE		4260	52.5	36	38	3/11

^a Grain yield: LSD (5%) = 914 lbs/acre and cv = 15.1%.

Table 6. Barley variety yield results from **Coolidge (WPB)**, 2005.

Entry	Source	Grain Yield ^a	Test Weight	Plant Height	Lodging	Heading
		lbs/acre	lbs/bu	inches	%	
Barcott	WPB	4048	50.2	---	---	---
Baretta	APB	5229	52.2	---	---	---
Chico	WPB	5481	52.9	---	---	---
Cochise	WPB	5984	51.7	---	---	---
Commander	WWW	6139	52.0	---	---	---
Gustoe	WPB	5093	52.1	---	---	---
Max	WWW	5829	52.9	---	---	---
Mucho	APB	4900	51.7	---	---	---
Nebula	WPB	5442	52.9	---	---	---
B02AZ(6)-10	APB	4977	52.8	---	---	---
B00-219	APB	5829	53.4	---	---	---
B02AZ(8)-15	APB	4338	51.4	---	---	---
BA1129	WWW	5674	52.6	---	---	---
BA4545	WWW	5442	51.4	---	---	---
BA8017	WWW	6081	51.8	---	---	---
Kurtford	WPB	5132	45.8	---	---	---
AVERAGE		5351	51.7	---	---	---

^a Grain yield: LSD (5%) = 856 lbs/acre and cv = 9.6%.

Table 7. Durum variety yield results from **Arizona City (APB)**, 2005.

Entry	Source	Grain Yield ^a	Test Weight	Plant Height	Lodging	Heading on 3/29	Grain Protein	HVAC
		lbs/acre	lbs/bu	inches	%	%	%	%
Alamo	WPB	2555	63.4	30	70	80	14.0	99
Crown	WWW	4877	59.8	37	0	6	13.5	99
Duraking	WWW	6270	62.8	35	10	21	12.0	98
Kofa	WPB	4645	62.2	35	30	100	14.3	99
Kronos	APB	5496	62.5	35	70	100	14.5	100
Matt	APB	4413	62.5	36	90	90	14.0	100
Mohawk	WPB	4877	62.0	36	90	51	13.6	100
Ocotillo	APB	5341	63.0	38	0	51	14.1	99
Orita	WPB	4993	60.5	34	5	1	13.6	99
Platinum	WWW	5922	61.1	33	20	6	13.7	99
Sky	APB	5341	61.4	31	30	51	13.6	100
WPB 881	WPB	4180	62.0	35	10	70	14.5	99
D474-4	APB	4335	62.8	36	60	100	14.3	100
D99-425	APB	6270	61.8	31	5	60	12.5	97
D257-11	APB	5767	62.8	35	50	41	13.8	99
D3117A	WWW	5806	60.4	38	0	70	13.7	98
D5384-2	WWW	4954	61.2	36	0	51	12.8	99
D6523	WWW	4993	61.3	37	10	6	14.0	98
D8270	WWW	4954	63.2	35	0	60	14.4	99
YU899-170	WPB	5729	62.5	36	0	80	14.0	99
YU802-4	WPB	5767	62.1	36	0	1	14.4	100
YU802-175	WPB	5535	62.7	34	5	21	14.4	99
AVERAGE		5137	62.0	35	25	51	13.8	99

^a Grain yield: LSD (5%) = 1027 lbs/acre and cv = 14.1 %.

Table 8. Durum variety yield results from **Maricopa (UA)**, 2005.

Entry	Source	Grain Yield ^a lbs/acre	Test Weight lbs/bu	Plant Height inches	Lodging %	Heading	Flower- ing	Maturity %	Grain Protein %	HVAC %
<u>Durum</u>										
Alamo	WPB	4275	63.6	38	45	3/13	3/20	5/02	15.2	99
Crown	WWW	5790	61.8	39	0	3/16	3/24	5/01	12.2	99
Duraking	WWW	6400	64.7	38	0	3/14	3/23	5/03	13.8	99
Kofa	WPB	5432	63.7	39	0	3/12	3/19	4/30	15.4	99
Kronos	APB	5163	63.4	37	12	3/09	3/15	5/02	14.9	99
Matt	APB	5163	63.4	37	21	3/13	3/17	4/29	14.3	99
Mohawk	WPB	6023	63.7	37	10	3/12	3/19	5/01	13.8	99
Ocotillo	APB	4773	63.4	41	0	3/16	3/24	5/08	14.7	99
Orita	WPB	6050	62.3	36	0	3/22	4/05	5/10	14.3	97
Platinum	WWW	6628	64.8	33	0	3/16	3/22	5/04	13.1	98
Sky	APB	5163	62.3	34	0	3/16	3/23	5/08	13.4	99
WPB 881	WPB	5257	63.2	37	0	3/14	3/21	5/04	14.4	98
D474-4	APB	5342	63.3	40	11	3/09	3/14	4/29	15.1	99
D99-425	APB	7009	65.2	34	0	3/13	3/19	5/04	11.1	95
D257-11	APB	6167	64.3	36	0	3/14	3/20	5/01	13.8	98
D3117A	WWW	6220	62.3	41	0	3/16	3/25	5/08	14.2	100
D5384-2	WWW	6413	63.4	37	0	3/15	3/22	5/07	13.1	96
D6523	WWW	5499	62.3	39	0	3/16	3/20	5/05	14.3	99
D8270	WWW	5700	64.2	38	0	3/17	3/27	5/01	14.3	99
YU899-170	WPB	6063	63.6	36	0	3/14	3/21	5/07	14.3	98
YU802-4	WPB	7135	64.2	37	0	3/24	4/05	5/09	13.1	98
YU802-175	WPB	6252	65.5	39	0	3/15	3/22	5/03	13.5	97
PH896-21	WPB	5772	64.6	36	3	3/16	3/20	5/01	13.9	95
GD008	Allstar	5996	64.8	38	0	3/16	3/22	5/02	12.7	96
GD009	Allstar	5378	64.3	38	24	3/14	3/21	5/01	14.4	98
GD007	Allstar	5136	64.2	41	31	3/14	3/26	5/03	13.2	98
AVERAGE		5753	63.7	38	6	3/14	3/22	5/03	13.9	98

^a Grain yield: LSD (5%) = 776 lbs/acre and cv = 9.6%.

Table 9. Durum variety yield results from **Maricopa (WWW)**, 2005.

Entry	Source	Grain Yield ^a lbs/acre	Test Weight lbs/bu	Plant Height inches	Lodging %	Heading	Grain Protein %	HVAC %
Alamo	WPB	4759	63.5	39	70	3/11	15.2	100
Crown	WWW	6184	61.5	42	10	3/15	14.7	99
Duraking	WWW	5579	64.3	38	40	3/13	14.2	99
Kofa	WPB	4255	62.1	37	20	3/09	16.3	100
Kronos	APB	3884	62.1	37	10	3/04	16.0	99
Matt	APB	4054	62.7	39	60	3/09	15.8	100
Mohawk	WPB	4845	63.2	38	80	3/08	15.1	99
Ocotillo	APB	4761	62.8	41	20	3/12	16.1	99
Orita	WPB	6135	62.7	38	10	3/23	15.0	100
Platinum	WWW	5696	64.3	35	10	3/12	14.5	98
Sky	APB	5301	61.6	35	30	3/10	14.3	99
WPB 881	WPB	3856	---	39	60	3/11	---	---
D474-4	APB	4370	61.5	36	70	3/04	16.6	99
D99-425	APB	5971	63.7	36	10	3/10	13.8	99
D257-11	APB	5675	62.9	37	60	3/11	15.4	99
D3117A	WWW	5823	61.1	40	30	3/13	14.5	99
D5384-2	WWW	5446	63.2	39	30	3/18	13.9	98
D6523	WWW	4770	62.0	38	60	3/13	15.7	100
D8270	WWW	5119	63.7	37	60	3/13	15.2	99
YU899-170	WPB	6758	63.4	40	20	3/10	15.1	99
YU802-4	WPB	6311	63.6	41	10	3/27	15.1	99
YU802-175	WPB	5035	64.6	38	0	3/16	15.9	99
PH896-21	WPB	4919	63.6	38	30	3/11	15.0	100
GD007	Allstar	4058	63.5	42	90	3/08	15.9	100
CHD1978B	WWW	5790	63.7	38	10	3/21	13.8	99
D0061	WWW	5981	---	39	60	3/20	---	---
Topper	WWW	5696	63.6	40	60	3/25	13.4	98
AVERAGE		5223	63.0	38	38	3/13	15.1	99

^a Grain yield: LSD (5%) = 952 lbs/acre and cv = 12.9%.

Table 10. Durum variety yield results from **Yuma (WPB)**, 2005.

Entry	Source	Grain Yield ^a lbs/acre	Test Weight lbs/bu	Plant Height inches	Lodging %	Heading	Grain Protein %	HVAC %
Durum								
Alamo	WPB	7794	65.3	34	53	3/23	13.9	100
Crown	WWW	7848	61.1	35	13	3/27	14.3	99
Duraking	WWW	9120	64.6	34	3	3/27	12.2	99
Kofa	WPB	7685	62.6	33	73	3/23	14.6	99
Kronos	APB	8302	62.8	31	67	3/20	14.2	99
Matt	APB	7884	62.8	33	87	3/21	14.3	99
Mohawk	WPB	8357	61.7	34	87	3/22	13.7	99
Ocotillo	APB	7848	63.4	36	43	3/26	14.2	100
Orita	WPB	7521	61.4	36	0	4/01	14.7	100
Platinum	WWW	8175	63.5	31	43	3/26	13.0	100
Sky	APB	7122	61.1	31	43	3/23	13.1	100
WPB 881	WPB	7703	63.0	32	43	3/22	14.1	99
D474-4	APB	8121	63.4	34	67	3/20	14.8	100
D99-425	APB	9084	62.0	30	30	3/24	12.4	99
D257-11	APB	7539	63.4	32	73	3/23	13.6	100
D3117A	WWW	7703	61.2	38	50	3/30	13.7	100
D5384-2	WWW	7739	62.1	33	50	3/28	13.6	100
D6523	WWW	8466	62.3	34	57	3/26	13.5	100
D8270	WWW	8012	63.6	31	50	3/27	13.6	100
YU899-170	WPB	8539	62.8	34	10	3/24	13.6	99
YU802-4	WPB	8320	63.7	37	0	4/02	13.9	99
YU802-175	WPB	7775	66.0	33	3	3/27	14.1	99
PH896-21	WPB	7885	64.2	32	60	3/25	13.2	99
GD008	Allstar	9120	64.9	36	37	3/27	12.9	94
GD009	Allstar	8030	63.9	36	87	3/26	15.2	100
GD007	Allstar	7794	63.8	38	73	3/27	13.6	100
Rio Colorado	WPB	8284	61.8	36	63	3/31	12.1	99
Atil-2001	WPB	9338	64.4	35	40	3/31	13.1	99
Oro	WPB	8520	63.0	36	7	3/31	13.4	99
Tacna	WPB	8102	62.9	32	40	3/18	14.5	99
YU895-99	WPB	8357	64.3	33	40	3/22	13.9	99
Trit 38011	RSI	8066	59.6	40	3	3/21	10.9	100
AVERAGE		8130	63.0	34	44	3/25	13.6	99

^a Grain yield: LSD (5%) = 832 lbs/acre and cv = 6.3%.

Table 11. Summary of small grain variety yield results for 2005 from Arizona City (APB), Maricopa (U of A), Maricopa (WWW), Yuma (WPB durum), and Coolidge (WPB barley).

Grain yield (% of location average for these entries)							
Entry	Source	Arizona City (APB)	Maricopa (U of A)	Coolidge (Barley) Yuma (Durum) (WPB)	Maricopa (WWW)	Mean	Standard Deviation
Barley							
Barcott	WPB	83	69	76	58	71	18
Baretta	APB	125	123	98	125	119	23
Chico	WPB	106	99	102	94	100	10
Cochise	WPB	124	84	112	95	103	23
Commander	WWW	103	108	115	96	105	12
Gustoe	WPB	92	107	95	103	99	14
Max	WWW	96	118	109	113	109	13
Mucho	APB	85	96	92	101	93	14
Nebula	WPB	106	111	102	104	106	13
B02AZ(6)-10	APB	96	112	93	104	102	16
B00-219	APB	131	107	109	107	114	15
B02AZ(8)-15	APB	74	68	81	87	77	13
BA1129	WWW	95	114	106	99	103	19
BA4545	WWW	107	106	102	98	103	15
BA8017	WWW	63	120	114	124	105	27
Durum							
Alamo	WPB	50	74	96	91	77	22
Crown	WWW	95	101	97	118	103	16
Duraking	WWW	122	111	112	107	113	13
Kofa	WPB	90	94	95	81	90	13
Kronos	APB	107	90	102	74	93	16
Matt	APB	86	90	97	78	87	14
Mohawk	WPB	95	105	103	93	98	14
Ocotillo	APB	104	83	97	91	93	12
Orita	WPB	97	105	93	117	104	17
Platinum	WWW	115	115	101	109	111	13
Sky	APB	104	90	88	101	96	16
WPB 881	WPB	81	91	95	74	85	11
D474-4	APB	84	93	100	84	89	12
D99-425	APB	122	122	112	114	118	9
D257-11	APB	112	107	93	109	106	14
D3117A	WWW	113	108	95	111	108	11
D5384-2	WWW	96	111	95	104	102	17
D6523	WWW	97	96	104	91	97	8
D8270	WWW	96	99	99	98	98	10
YU899-170	WPB	112	105	105	129	113	14
YU802-4	WPB	112	124	102	121	115	11
YU802-175	WPB	108	109	96	96	103	16